The Re-Charge Cross Section of Nitrogen Ions in Gases

56-7-63/66

ASSOCIATION Moscow State University
(Moskovskiy gosurdarstvennyy universitet)

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Card 2/2

AUTHORS: Teplova, Ya. A., Nikolayev, V. S., Dmitriyev, I. S., Fateyeva, L. N. SOV/56-34-3-5/55

TITLE: Ranges and Specific Ionisation of Multi-Charged Ions in Gases (Probegi i udel'naya ionizatsiya mnogozaryadnykh ionov v gazakh)

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1958, Vol. 34, Nr 3, pp. 559-568 (USSR)

ABSTRACT: Measurements were made of the path length and the specific ionisation of the ions from Be to Ne at velocities of from 1,5.10^8 to 12.10^8 cm/sec in argon, air, and hydrogen. The authors start with the description of the experimental method, they here use a focused ion beam from a 72 cm cyclotron. The method of the measurement is based upon that the recorder of the charged particles, which was mounted on a movable bar, was moved on the trajectory of the beam inside the slowing down chamber to measure the relative ionisation along the beam. Also the slowing down of the ions in a gas filled chamber is described. The specific ionisation and the ranges of the ions with velocities of from 4.10^8 to 12.10^8 cm/sec were measured by means of a calibrated counter with a linear amplifier. The ranges of the nitrogen ions at velocities of from

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$1,5.10^8$ to 4.10^8 cm/sec were measured by means of a planar ionisation chamber. The next paragraph deals with the analysis of the results and with the experimental errors. The measurements furnished the dependence of the magnitude of the momenta (or of the ionisation current) on the distance between the counter and the spot where the beam entered the slowing down chamber. The results of the measurement of the ranges are illustrated in a diagram in form of the dependence of Z^2R/A on E/A, i. e. in units which do not depend on the isotopic mass of the ion A. The energy which has to be used up for the production of an ion pair does not depend, within the measuring error limits, on the velocity and on the shape of the ion A; that is to say, the shapes of the curves of the specific ionisation and of the mean energy loss dE/dx agree with each other. A comparison of the ranges of the ions in various gases shows the following: At the same velocity the range in argon is by 6°/o longer and in hydrogen 3,7 times as long as in air and this relation decreases somewhat with increasing Z of the ion. The specific ionisation at $v<5.10^8$ cm/sec is proportional to the velocity and it has a maximum at $v\sim6 - 8.10^8$ cm/sec similar as in the Bragg curve for the α - particles. In the maximum $dE/dx\approx1,5$ Z MeV/cm holds. For the transition from argon to air for all ions the coefficient 0,92 ± 0.05 can be used, and

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for the transition from hydrogen into air the coefficient 0.29 ± 0.01. The last paragraph gives a discussion of the results. The ranges of the ions in air, measured by means of a ionisation chamber are by about 1 mm shorter than the ranges measured by a counter. This can be explained qualitatively only by nuclear collisions. The slowing down power of the photoemulsion for the here examined ions in air resembles the slowing down power for α - particles. The results of the measuring of the specific losses in case of the ions ^{14}N agree with the data already known before within the experimental errors. But the here found data for the ions ^{20}Ne are by 30% higher than the values found before. This difference can hardly be explained by the influence or nuclear collisions.
There are 5 figures, 2 tables, and 26 references, 7 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: September 20, 1957.

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24 (7)
AUTHORS: Teplova, Ya. A., Nikolayev, V. S. SOV/48-23-7-23/31
Dmitriyev, I. S., Fateyeva, L. N.

TITLE: The Path Length and the Specific Ionization of Multiply Charged Ions (Probegi i udel'naya ionizatsiya mnogozaryadnykh ionov)

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959, Vol 23, Nr 7, pp 894-897 (USSR)

ABSTRACT: As the known experimental data on the stopping of multiply charged ions in a substance are considered insufficient by the authors, they carried out experiments with the ions ^{23}Na, ^{25}Mg, ^{27}Al, ^{31}P, ^{37}Cl, ^{40}Ar, ^{39}K, ^{81}Br and ^{84}Kr. A 72-centimeter cyclotron was used as ion source which delivers ions with the velocities of 2.5 to $12 \cdot 10^8$ cm/sec which corresponds to an energy of 25 to 600 kev. The particles were recorded by a twofold proportional counter, and details of the measuring methods are described. The measurements showed that the specific ionization is proportional to the path length, and the path length is proportional to the velocity of the particles if the latter does not exceed $5 \cdot 10^8$ cm/sec. Subsequently, the dependence of

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the path length at an air pressure of 760 mm Hg on the nuclear-charge number of the ions is investigated, and the results are represented in a diagram (Fig 3). The stopping power of air and celluloid in dependence on the nuclear-charge number of the ions was calculated for an ion velocity of $3.5 \cdot 10^8$ cm/sec, and the results are represented in the diagrams in figures 5 and 6. The data obtained in the experiments described are used for this calculation. Finally, the difference between the mean charge of ions in gases and in solid substances is investigated, and it is ascertained that the stopping power very much depends on the nuclear-charge number in solid substances. There are 6 figures and 6 references, 4 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gos. universiteta im. M. V. Lomonosova (Scientific Research Institute of Nuclear Physics of Moscow State University imeni M. V. Lomonosov)

FATEYEVA, L. N.

PHASE I BOOK EXPLOITATION SOV/5555

Febelstseva, O. M., ed.

Uskoriteli; sbornik statey (Accelerators; Collection of Articles) Moscow, Atomizdat, 1960. 121 p. Errata slip inserted. 5,000 copies printed.

Scientific Ed.: B.M. Tablokov; Ed.: O.M. Febelstseva; Tech. Ed.: B.A. Vlasova.

PURPOSE: This collection of articles is intended for scientists and engineers engaged in the construction and operation of particle accelerators.

COVERAGE: These original articles treat specific problems arising in the operation of present-day accelerators, particularly linear electron accelerators. A new accelerator put into operation at the Dnipropetrovsk Institute of Chemical Technology (Ukrainian Physicotechnical Institute) is described, and problems in the dynamics of particles in linear electron accelerators from accelerators. Problems associated discussed for the extraction of particles from accelerators. Problems of multicharge with the shaping of permanent magnetic fields and the acceleration of the phasotron ion are also treated. The changeover of the series cyclotron to the phasotron acceleration mode with a view to increasing the energy of accelerated particles is described, and some problems connected with the bunching of particles are elaborated. No personalities are mentioned. References accompany each article.

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B003/B063

26.1420 (2117, 2217)

AUTHORS: Dmitriyev, I. S., Nikolayev, V. S., Fateyeva, L. N., Teplova, Ya. A.

TITLE: The Amount of the Mean Charge of Ions Passing Through a Substance

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 9, pp. 1169-1174

TEXT: The present paper describes an experimental study of the equilibrium charge distribution of ions of light elements ($2 \leq Z \leq 18$) and of Kr ions in helium, nitrogen, argon, krypton, and celluloid foil. Besides, the authors measured the charge exchange cross sections of these ions in gases. A 72-cm cyclotron (Ref. 3) served as the source of fast, multiply charged ions. The experimental arrangement is shown in Fig. 1. The equilibrium charge distribution of the ions with $Z \leq 10$ was measured in the velocity range of $(2.6 \div 12).10^8$ cm sec^{-1}. In this velocity range and for the above-mentioned substances, the width of distribution σ is nearly equal for each ion. The dependence of the degree of ionization i/Z on the ion

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velocity differs in the various media (Fig. 2). The monotonous course of $\bar{i}/Z$ is a matter of fact within one period of Mendeleyev's periodic table. As it seemed to be unjustified to extend this dependence to a wider range of variations of Z, the equilibrium charge distribution of the ions with $Z > 10$ in the above-mentioned substances was measured at velocities of $2.6.10^8$ and $4.1.10^8$ cm sec^{-1}. It was found that at these ion velocities the mean charge $\bar{i}$ increases with increasing Z in all substances. The Z-dependence of the degree of ionization $\bar{i}/Z$ shows different characters in gases and solids. Fig. 3 shows the dependence of $\bar{i}/Z$ on Z in helium (I) and celluloid foil (II) for $v = 2.6.10^8$ cm sec^{-1} (a) and $v = 4.1.10^8$ cm sec^{-1} (b). Fig. 4 shows the dependence of $\bar{i}^2$ on Z in nitrogen (1) and celluloid foil (2) for $v = 2.6.10^8$ cm sec^{-1} (a) and $v = 4.1.10^8$ cm sec^{-1} (b). Fig. 5 shows the dependence of ϕ_i on Z and Fig. 6 the dependence of the width of the equilibrium charge distribution $\sigma = \sqrt{\bar{i^2} - \bar{i}^2}$ on Z. The perturbation of the continuity of $\bar{i}$ and ϕ_i as a function of Z is due to the fact that

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the filling of the third electron shell begins in the range Z = 11---13. The equilibrium charge distribution of the ion beam depends on the cross sections of the electron loss (Q_n) and capture ($Q_з$). The measurement of these cross sections shows that the dependence of Q_n and $Q_з$ on Z of the ions does not take a monotonic course (Fig. 7). The results obtained prove that it is necessary to take into account the effect of the periodic structure of the electron shell of the ions upon the amounts of $\bar{i}$ and $\bar{i}^2$. There are 7 figures and 5 Soviet references.

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AUTHORS: Nikolayev, V. S., Dmitriyev, I. S., Fateyeva, L. N., Teplova, Ya. A.

TITLE: Investigation of the Equilibrium Charge Distribution in a Beam of Fast Ions

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 39, No. 4(10), pp. 905-914

TEXT: This is in continuation of an earlier work of the authors (Ref. 1) in which they studied the equilibrium charge distribution in a beam of ions of light elements (Z = 5 to Z = 10) and found a monotone dependence of the average charge $\bar{i}$ on Z. The purpose of the present work was to study the function $\bar{i} = f(Z)$ at the transition from one period of the periodic system to another. For this purpose, the equilibrium distribution of ions of He, Li, B, N, Ne, Na, Mg, Al, P, Ar, and Kr in helium, nitrogen, argon, krypton and in a celluloid film was measured. The measurements for He, B, N, and Ne were made in a larger range of

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velocities than in Ref. 1. For ions with $Z > 10$, the measurements were made only at $v = 2.6 \cdot 10^8$ cm/sec; for Na, P, and Ar the measurements were also made at $4.1 \cdot 10^8$ cm/sec. The multi-charge ions were accelerated in a 72-cm cyclotron. Ions of charges $i \pm 1$, $i \pm 2$, etc. were obtained from those of the initial charge i by passing them through a celluloid film of approximate thickness 2 $\mu g/cm^2$. The data for the equilibrium distribution of ions with $Z < 10$ are given in Tables 1-3, and in Fig. 1. In all mediums, the distribution was nearly Gaussian:
$\Phi_i \approx (1/\sigma\sqrt{2\pi}) \exp\left[-(i - \bar{I})^2/2\sigma^2\right]$. The curve is characterized by two parameters: the average charge $\bar{I} = \sum_i \Phi_i i$ and the width of the distribution $\sigma = \left[\sum_i \Phi_i (i - \bar{I})^2\right]^{1/2}$. For He, Li, B, N, and Ne, σ was again found to increase monotonically with increasing Z. $\bar{I}$ was found to be different in the different media (Fig. 2). The following rule was found to hold for all ions: maximum value of $\bar{I}$ in nitrogen and argon,

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$\bar{I}_{He} < \bar{I}_N$; $\bar{I}_{Kr} < \bar{I}_{Ar}$. The authors note that the dependence of $\bar{I}$ on the atomic weight Z_m in gases does not fit the theoretical estimates made in Refs. 14 - 16 on the basis of the statistical model of the atom. The data for the equilibrium distribution of $Z > 10$ ions are given in Figs. 3 and 4. For the same velocities, the dependence of $\bar{I}$ on the medium was about the same as for $Z \leq 10$. However, the difference between $\bar{I}$ in gases and in celluloid film increases very much for $Z > 10$. The maximum of this difference for light ions is 15%, while for Ne it is about 50%, for Na, Mg, and Al about 60%, for P about 80%, and for Kr about 130%. For a given velocity, $\bar{I}$ increases with Z in all media. In contrast thereto, the degree of ionization $\bar{I}/Z$ decreases monotonically in gases (Fig. 5). Around $Z = 10$, however, the decrease in the degree of ionization becomes slower, and for solid media even an increase takes place. Still more noticeable is the perturbation in the continuity of the function $\Phi_i = f(Z)$ (Fig. 3). For $Z = 12$, Φ_o and Φ_i show clear minima. In this range of Z, the width σ of the equilibrium distribution also becomes less (Fig. 6). This discontinuity in the dependence of Φ_i, i, and σ on Z

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observed in the range Z ~10 - 12 is explained as being due to the beginning of the filling of a new electron shell. There are 6 figures, 3 tables, and 18 references: 7 Soviet, 7 US, 2 British, and 2 Danish.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of the Moscow State University)

SUBMITTED: April 13, 1960

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NIKOLAYEV, V.S.; FATEYEVA, L.N.; DMITRIYEV, I.S.; TEPLOVA, Ya.A.

Capture of several electrons by fast multicharge ions. Zhur.eksp.i teor.fiz. 41 no.1:89-99 Jl '61. (MIRA 14:7)

1. Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta.
(Electrons—Capture) (Ion beams)

NIKOLAYEV, V.S.; DMITRIYEV, I.S.; FATEYEVA, L.N.; TEPLOVA, Ya.A.

Experimental study of electron capture by multiply charged ions.
Zhur. eksp. i teor. fiz. 40 no.4:989-1000 Ap '61. (MIRA 14:7)

1. Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta.
(Electrons--Capture) (Ions) (Cyclotron)

S/048/62/026/011/018/021
B125/B102

AUTHORS: Nikolayev, V. S., Dmitriyev, I. S., Fateyeva, L. N., and Teplova, Ya. A.

TITLE: Charge exchange of various ions in their interaction with residual gas

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 11, 1962, 1430-1434

TEXT: The charge distribution in ion beams was measured after their passage through the experimental setup used for determining the cross sections of electron loss and capture by ions with $2 \leq Z \leq 18$. This setup contains only the residual gas of $(1.2\text{-}1.5)\cdot10^{-5}$ mm Hg. For ions with $Z \leqslant 10$ the measurements were made at energies of 35-350 kev per nucleon and ion velocities of $2.6\cdot10^8$ to $8\cdot10^8$ cm/sec, for $Z > 10$ at $v = 2.6\cdot10^8$ cm/sec, and for phosphorus and argon ions at $v = 4.1\cdot10^8$ cm/sec. These ions (charge i) were accelerated in a 72-cm cyclotron and passed through a charge exchange chamber, then recorded by a system of eight proportional counters. This apparatus was evacuated by oil vapor diffusion pumps. The ion beam that had passed through the setup always contained ions with

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final charges $k \neq i$ besides ions with the initial charge i. Fig. 2 shows typical distributions of charges in the ion beam. The ion charges are evidently changed by one interaction with the residual gas molecules. $\bar{\Phi}_{ik} = n\sigma_{ik}$ holds for $k \neq i$, where σ_{ik} is the mean charge exchange cross section (from charge i to k). n is the mean number of molecules in the volume; unit cross section·path of the ion; $\bar{\Phi}_{ik}$ is the relative number of ions with charge k. Notwithstanding the presence of oil vapor, the experimental values of $\bar{\Phi}_{ik}$ in the residual gas nearly always agree with the values of Φ_{ik} in nitrogen, except the values of Φ_{10} which are much higher for ions with $Z \sim 11$-12 than for nitrogen ions. Therefore the minimum of the function $\Phi_{10}(Z)$ is less deep than for nitrogen. This minimum is still less deep for the residual gas than for krypton. If the ion beam passes through a celluloid film, the values of $\Phi_{i,i+1}$ mostly exceed the theoretical values. This suggests the presence of excited ions with lifetimes of $\sim 10^{-7}$ sec in the ion beam. There are 4 figures.

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Fig. 2. The values of $\bar{\Phi}_{ik}$ for phosphorus ions after their passage through the residual gas (1) and nitrogen (2) at the ion velocity $v = 2.6 \cdot 10^8$ cm sec^{-1}, ion energy $E \approx 1.1$ Mev.

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B125/B108

24.6712

AUTHORS: Dmitriyev, I. S., Nikolayev, V. S., Fateyeva, L. N., Teplova, Ya. A.

TITLE: Experimental study of electron losses by multiply charged ions in gases

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 1, 1962, 16 - 26

TEXT: The cross sections $q_{i,i+1}$ of collisions with loss of an electron of 1-6-fold charged ions of light elements (Z = 2 - 18) and krypton ions in helium, nitrogen, argon, and krypton for ion velocities of $2.6 \cdot 10^8$ - $12 \cdot 10^8$ cm/sec were measured by mass spectroscopy with an apparatus described by V. S. Nikolayev et al. (ZhETF, 40, 989, 1961). The error was below ± 15%. The ions were scattered through angles of $\theta \lesssim 0.005$ radians. The $\sigma_p/\sigma_{i,i+1}$ ratios decrease rapidly with increasing ion velocity; σ_p denotes the total cross section of scattering through angles $\theta \lesssim 0.005$. The values of σ_{12}

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found by M. I. Korsunskiy et al. (DAN SSSR, 103, 399, 1955) for N ions in nitrogen are by 25% lower than the present results. The dependence of the impact cross sections with loss of an electron on ion velocity has the same character for all gases investigated. The cross sections for ions with i = 1 and i = 2, and for N ions with i = 3 and i = 4 attain maximum values. The velocity v_m which corresponds to the maximum cross section increases with increasing ion charge as $v_m \sim \psi u$; $u = (2I/\mu)^{1/2}$, I = binding energy of the lost electron, μ = electron mass, ψ = coefficient dependent on the medium. The cross sections $\sigma_{i,i+1}$ generally increase with Z. For a given Z, the cross sections decrease with increasing i as exp(-mi), where $m \sim 1$ at $v \sim 3 \cdot 10^8$ cm/sec for Z = 10 and Z = 18, and $m \sim 1.5$ for Z = 3 and Z = 12. Generally, the electrons are lost from the outer shell. For equal v/u, the $\sigma_{i,i+1}/q$ ratio is approximately proportional to I^{-a}; a depends only slightly on v/u, and is near unity. q denotes the number of electrons in the outer shell. The dependences of the theoretical and experimental cross sections on v and I are qualitatively the same. Considering screening of the Coulomb field, the electron losses in light media at $v \gg u$ agree with the experimental value. For heavy media, the generalized Bohr formula is

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$\sigma_{i,i+1} \approx \pi a_o^2 q Z_c^{2/3} v_o^2/vu$, where $a_o = 0.53 \cdot 10^{-8}$ cm and $v_o = 2.19 \cdot 10^8$ cm/sec. The approximate theoretical results of O. B. Firsov (ZhETF, 36, 1517, 1959), which are applicable for $v \ll v_o$, differ from the present results by a factor of 2.5 at most. The experimental data indicate the correctness of the theoretical calculations for very small and very large ion velocities and also for the range $v \sim u$. In the range $0.5 < v/u < 1.5$, $\sigma_{i,i+1} \approx qI^{-1} f(v/u)$ holds according to Ya. M. Fogel' et al. (ZhETF, 32, 453, 1957). The general character of the dependence of $\sigma_{i,i+1}$ on v agrees with H. S. W. Massey's adiabatic hypothesis. The adiabatic parameter can be represented in the form $pa/\hbar$ or p/p_o according to G. F. Drukarev (ZhETF, 37, 847, 1959). $p = |\Delta E|/v$ denotes the change in ion momentum in inelastic forward scattering. There are 8 figures and 18 references: 10 Soviet and 8 non-Soviet. The four most recent references to English-language publications read as follows: S. K. Allison. Rev. Mod. Phys., 30, 1137, 1958; S. K. Allison, J. Guevas, M. Garcia-Munoz. Phys. Rev., 120, 1266, 1960; H. L. Reynolds, L. D. Wyly, A. Zucker. Phys. Rev., 98, 1825, 1955; S. Krasner. Phys. Rev., 99, 520, 1955.

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Experimental study of electron...

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of the Moscow State University)

SUBMITTED: June 21, 1961

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33993
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B125/B108

24.6712
AUTHORS: Teplova, Ya. A., Nikolayev, V. S., Dmitriyev, I. S., Fateyeva, L. N.

TITLE: Slowing down of multiply charged ions in solid and gaseous media

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 1, 1962, 44 - 60

TEXT: The ranges R, the specific energy losses dE/dx, and the straggling S of fast multiply charged ions of He, Li, Be, B, C, N, O, Ne, Na, Mg, Al, P, Cl, K, Br, and Kr ($2.6 \cdot 10^8$ - $11.8 \cdot 10^8$ cm/sec) with energies of 25 - ~700 kev/nucleon in hydrogen, helium, methane, benzene, air, argon, and various mixtures of these gases were measured. Moreover, the specific energy losses in celluloid, Al, Ni, Ag, and Au were measured for a wide range of Z and Z_c (Z = ion charge, Z_c = atomic number of the medium) by means of a multiwire proportionality counter. The ions were accelerated with a 72-cm cyclotron. The methods of measuring R and dE/dx have been

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presented before (Izvestiya AN SSSR, seriya fiz., 23, 894, 1959; ZhETF, 34, 559, 1958). Because of the small range and weak intensity of the ion beams of Be, C, Na, Mg, Cl, K, Br, and Kr, only their maximum ranges R" were measured. The relation $R = kv$ holds with an accuracy of 5 - 7% for ions with $Z \geq 2$ up to a certain maximum velocity v_m; k increases with Z as $\sim Z^{1/2}$. For ions of He to Ne v_m ranges from $5 \cdot 10^8$ to $8 \cdot 10^8$ cm/sec. In the velocity range investigated, R" increases not monotonically on Z but fluctuates periodically by ~30%. The fluctuation amplitude decreases with increasing velocity. The dependence $R(Z_c)$ of N ions is similar to that of protons. With decreasing velocity, the absolute value of straggling S, becomes smaller but the ratio still $\delta = S/R$ increases. At constant velocity, the functions $S(Z)$ and $\delta(Z)$ are nonmonotonic. The fluctuations of $R(Z)$ and $S(Z)$ are explained by a considerable effect of the electron structure (filling up of the L and M shells, etc.) of the ions. The law of additivity of dE/dx in mixtures is fulfilled for multiply charged ions as well as for protons and α-particles. In the qualitatively valid relation $dE/dx \approx v^m f(Z_c, Z)$, m is near unity at velocities below $8 \cdot 10^8$ cm/sec,

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decreases with increasing velocity, and tends to -2 at $v \gg 12 \cdot 10^6$ cm/sec. $(dE/dx)_{max} \sim Z^{f(Z_c)}$ holds for any ion group. According to V. G. Tel'kovskiy et al. (DAN SSSR, 113, 1035, 1957), the experimental values of dE/dx for protons in Ag are 50% higher than the theoretical values. O. B. Firsov (ZhETF, 36, 1517, 1959) found that $-dE/dx = 2.34(Z+Z_c)v \cdot 10^{-15}$ ev·cm^2/atom. Because of the electron structure of the ions, which becomes more and more distinct with increasing velocity ($v > v_0$), it is more convenient to use the Hartree-Fok method instead of the Thomas-Fermi model. At $v \gg u$ (u = velocity of orbital electrons of the medium), the calculation of dE/dx for inelastic collisions of protons in hydrogen with electrons from modified quantum-mechanical formulas of Bethe and Bloch, and from the classical formula of Bohr at $v \sim 4 \cdot 10^8$ cm/sec yields a value 5 - 7% smaller than the experimental values. For multiply charged ions, this applies to large v, but with increasing Z_c and decreasing v this theory deviates more and more from the experiment. S. S. Vasil'yev is thanked for interest, the cyclotron team, particularly A. A. Danilov,

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M. Kh. Listov, and V. P. Khlapov for performing the experiments, and O. B. Firsov for discussions. There are 8 figures and 26 references: 8 Soviet and 18 non-Soviet. The four most recent references to English-language publications read as follows: P. G. Roll, F. S. Steigert, Nucl. Phys., 17, 54, 1960; D. J. Porat, K. Ramavataram. Proc. Phys. Soc., 77, 97, 1961; J. M. Alexander, M. F. Gazdik. Phys. Rev., 120, 874, 1960; P. G. Roll, F. E. Steigert. Phys. Rev., 120, 470, 1960.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of Moscow State University)

SUBMITTED: July 12, 1961

S/056/62/043/002/001/033
B102/B104

AUTHORS: Dmitriyev, I. S., Nikolayev, V. S., Fateyeva, L. N., Teplova, Ya. A.

TITLE: Study of the loss of several electrons by fast multiply charged ions

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 2(8), 1962, 361-369

TEXT: Many-electron loss cross sections for multiply-charged ions of light elements with $Z \geqslant 3$ were measured in He, N, Ar, and Kr. The velocity of the ions was $(2.6\text{-}12)\cdot 10^8$ cm/sec (35 - 750 kev per nucleon). The cross sections were determined by mass spectrometry, using an apparatus described in ZhETF, 40, 989, 1961. Two-electron loss cross sections were determined for Li, B, C, N, O, Ne, Na, Mg, Al, P, and Ar, three-electron loss cross sections for N, Ne, Na, Mg, Al, P, and Ar, four-electron cross sections for N, Ne, P, and Ar, and five-electron cross sections for P and Ar. The first two had an error of 15-20%, and the last two had one of 30%. The

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Study of the loss of several electrons ...

cross sections are denoted by $\sigma_{i,i+n}$, n=2....5. The electron loss cross section is proportional to the electron number q_i of the outer shell, so that $\sigma_i = (1/q_i) \sum_{s=1}^{q} s\sigma_{i,i+s}$ for the loss of one electron, $\sigma_i^{(2)}$ $= C_q^{-2} \sum_{s=2}^{q} C_s^2 \sigma_{i,i+s}$ for the loss of an electron pair, where $C_s^2 = s(s-1)/2$, C_s^2 and C_q^2 (analogously defined) are the numbers of pairs which can be formed from s and q electrons, respectively. Formulas are also given for the loss probability and the cross-section ratios. The results suggest that the loss of an electron is independent of the existence of the others in an ion-atom collision of the medium. The mean loss probability of individual electrons is small and depends on the binding energy of the electron in the ion. Electron losses occur chiefly if the collision parameters are of the order of the electron shell dimensions. The case under consideration (ion scattering angle $\theta \leqslant 0.005$ rad) corresponds to

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collision parameters $p \geqslant 3 \cdot 10^{-9}$ cm. The experimental values are 5-10 times higher than the cross sections calculated by Russek and Thomas (Phys. Rev. 109, 2015, 1958; 114, 1538, 1959) for these p-values on the basis of the quasimolecular electron loss mechanism. However, the experimental results are in very good agreement with the assumption of a direct interaction. Simultaneous loss of several electrons has a considerable effect on the equilibrium charge distribution when the ion beam passes through the gas, which is nearly Gaussian without multiple electron exchanges. There are 4 figures.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of Moscow State University)

SUBMITTED: November 14, 1961

Card 3/3

TEPLOV, I.B.; ZAZULIN, V.S.; FATEYEVA, L.N.

Telescope for studying nuclear reactions. Vest. Mosk. un. Ser. 3: Fiz., astron. 18 no.6:3-12 N-D '63. (MIRA 17:2)

1. Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta.

NIKOLAYEV, V.S.; DMITRIYEV, I.S.; TEPLOVA, Ya.A.; FATEYEVA, L.N.

Dependence of the mean charge of fast ions on the density of the medium. Izv. AN SSSR. Ser. fiz. 27 no.8:1078-1080 Ag '63. (MIRA 16:10)

L 40776-65 EWG(j)/EWT(m)/EWP(j)/EWA(h)/EWA(1) Pc-4/Peb RM
ACCESSION NR: AP5006484 S/0056/65/048/002/0385/0392

21
18
B

AUTHORS: Teplov, I. B.; Fateyeva, L. N.

TITLE: The reaction $C^{12}(\alpha, p_0)N^{15}$ at 16 to 26 MeV alpha-particle energy 19

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 48, no. 2, 1965, 385-392

TOPIC TAGS: alpha proton reaction, direct interaction, stripping reaction, knock out reaction, angular distribution, excitation curve

ABSTRACT: This is an elaboration of a preliminary report presented earlier (Proceedings of the Conference on Direct Interaction and Nuclear Reaction Mechanisms, Padua, 1962). The experiments were performed with an external-focus beam of alpha particles accelerated to 26 MeV in the 120 cm cyclotron of the Institut yadernoy fiziki MGU (Nuclear Physics Institute of the Moscow State University). The bom-

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barding particle energy was varied by slowing down the alpha particles in aluminum foils. The intensity of the particle beam incident on the target was increased by means of short-focus magnetic lenses placed between the foils and the target. The protons produced in the reaction were counted by a telescope of four proportional counters. The target was a mylar polyester film ($C_{10}H_8O_4$) 10 microns thick. The excitation functions of the reaction $C^{12}(\alpha, p_0)N^{15}$ with formation of the final nucleus in the ground state were measured for 11 different proton emission angles. The excitation curves have a resonant structure which is apparently related to the mechanism of compound nucleus formation. The angular distributions depend strongly on the alpha-particle energies. At almost all energies, a peak is observed in the differential cross section at large angles. The shape of the angular distributions indicates that the direct process makes an appreciable contribution to the reaction mechanism, but the present theory of direct reactions cannot explain the observed energy

L 40776-65
ACCESSION NR: AP5006484

dependence of the angular distributions. "The authors thank A. N. Orlov for major assistance in this work, and also the cyclotron crew." Orig. art. has: 7 figures.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of the Moscow State University)

SUBMITTED: 15May64 ENCL: 00 SUB CODE: NP

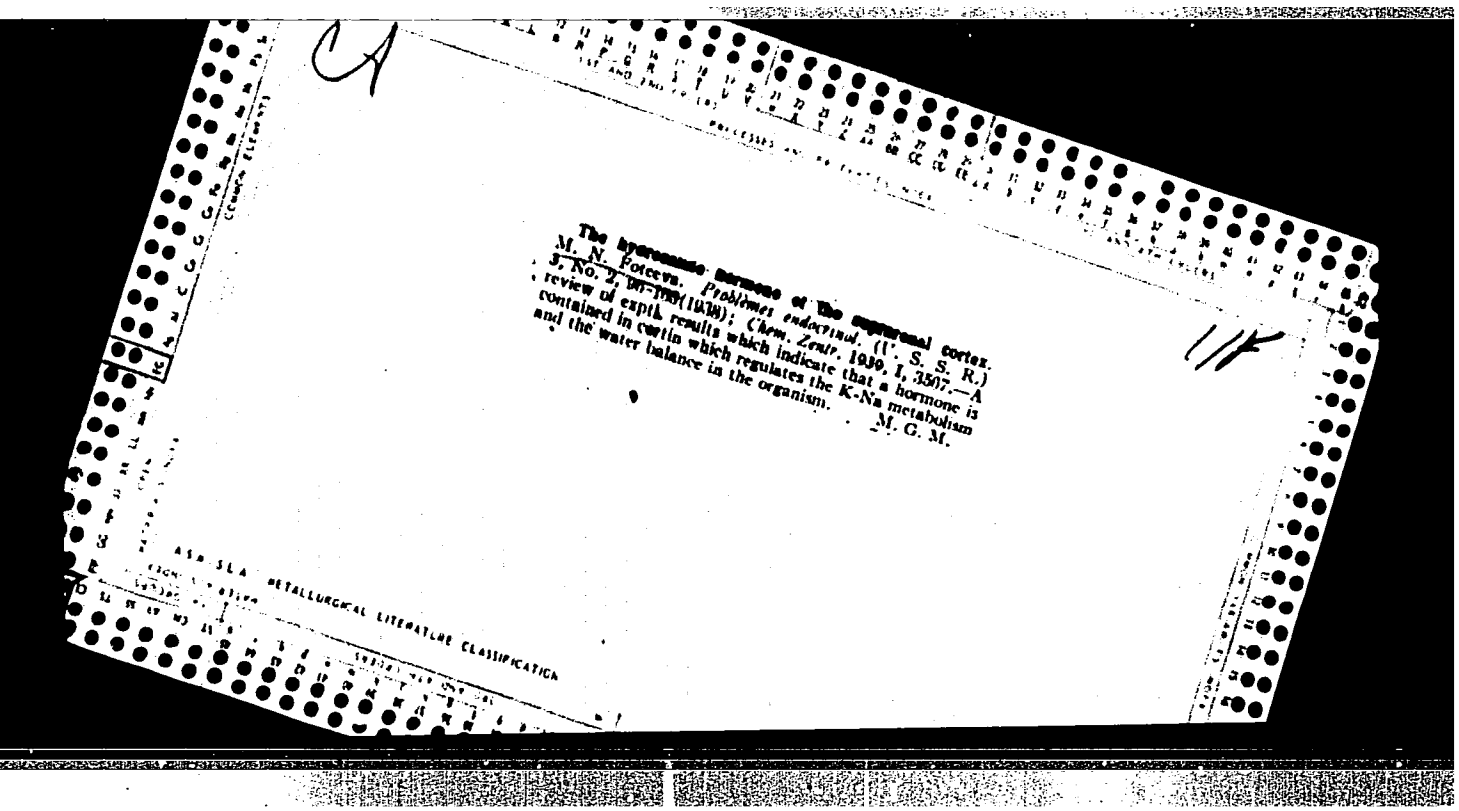
NR REF SOV: 004 OTHER: 019

Card 3/3

TEPLOV, I.B.; FATEYEVA, L.N.

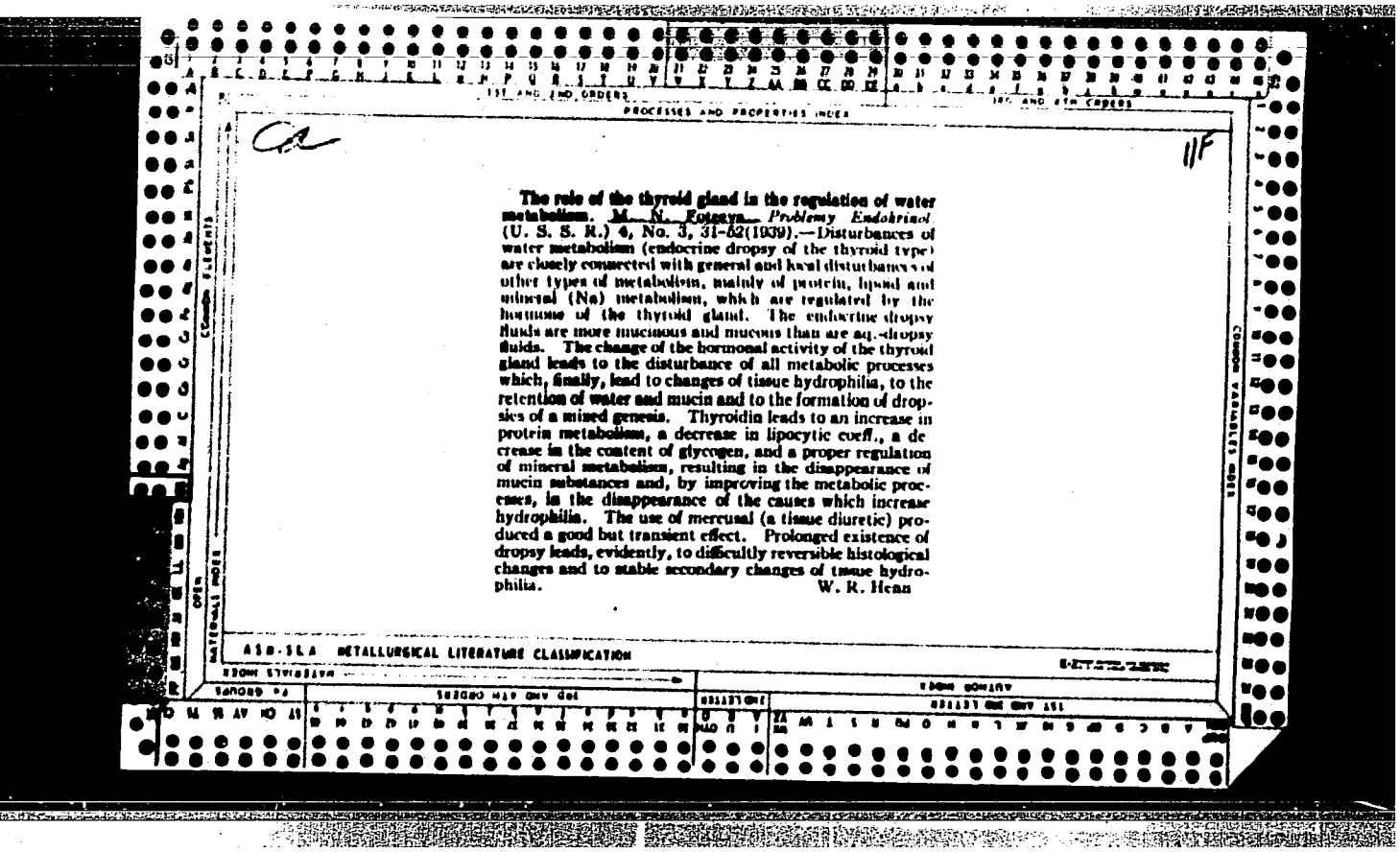
The C^{12} (α, p_0) N^{15} reaction in the α-particle energy range of 16 to 26 Mev. Zhur. eksp. i teor. fiz. 48 no.2:385-392 F '65. (MIRA 18:11)

1. Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta.



The hypertensive hormone of the suprarenal cortex. M. N. Foiceva. *Problèmes endocrinol.* (U. S. S. R.) 3, No. 2, 107–19(1938); *Chem. Zentr.* 1939, I, 3507.—A review of exptl. results which indicate that a hormone is contained in cortin which regulates the K-Na metabolism and the water balance in the organism. M. G. M.

ASB SLA METALLURGICAL LITERATURE CLASSIFICATION



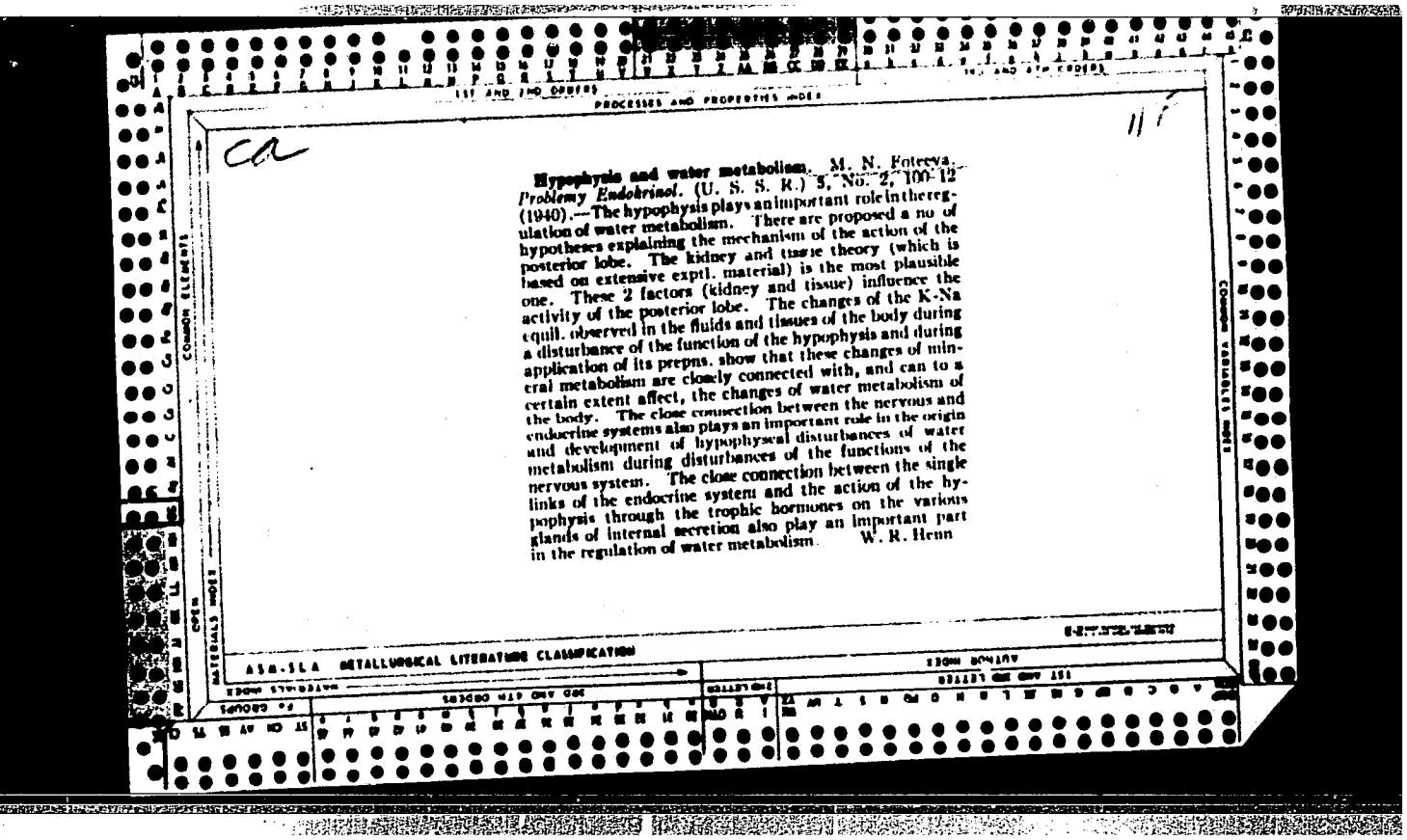
PROCESSES AND PROPERTIES INDEX

11F

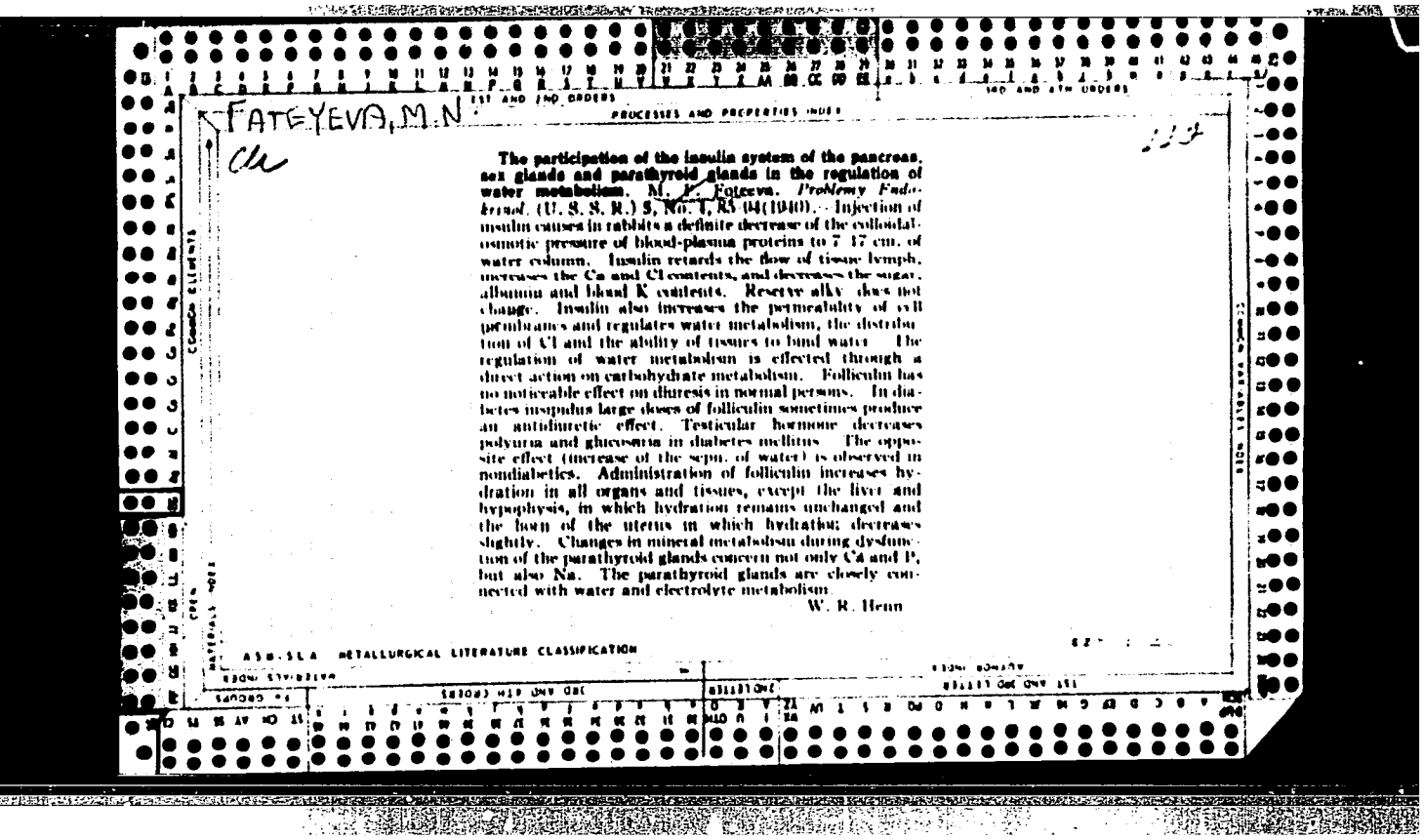
The role of the thyroid gland in the regulation of water metabolism. M. N. Fotieva. *Problemy Endokrinol. (U. S. S. R.)* 4, No. 3, 31-52(1939).—Disturbances of water metabolism (endocrine dropsy of the thyroid type) are closely connected with general and local disturbances of other types of metabolism, mainly of protein, lipoid and mineral (Na) metabolism, which are regulated by the hormone of the thyroid gland. The endocrine dropsy fluids are more mucinous and mucous than are aq.-dropsy fluids. The change of the hormonal activity of the thyroid gland leads to the disturbance of all metabolic processes which, finally, lead to changes of tissue hydrophilia, to the retention of water and mucin and to the formation of dropsies of a mixed genesis. Thyroidin leads to an increase in protein metabolism, a decrease in lipocytic coeff., a decrease in the content of glycogen, and a proper regulation of mineral metabolism, resulting in the disappearance of mucin substances and, by improving the metabolic processes, in the disappearance of the causes which increase hydrophilia. The use of mercural (a tissue diuretic) produced a good but transient effect. Prolonged existence of dropsy leads, evidently, to difficultly reversible histological changes and to stable secondary changes of tissue hydrophilia.

W. R. Hean

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION



Hypophysis and water metabolism. M. N. Foteeva. *Problemy Endokrinol.* (U. S. S. R.) 9, No. 2, 100-12 (1940).—The hypophysis plays an important role in the regulation of water metabolism. There are proposed a no of hypotheses explaining the mechanism of the action of the posterior lobe. The kidney and tissue theory (which is based on extensive expt. material) is the most plausible one. These 2 factors (kidney and tissue) influence the activity of the posterior lobe. The changes of the K-Na equil. observed in the fluids and tissues of the body during a disturbance of the function of the hypophysis and during application of its prepns. show that these changes of mineral metabolism are closely connected with, and can to a certain extent affect, the changes of water metabolism of the body. The close connection between the nervous and endocrine systems also plays an important role in the origin and development of hypophyseal disturbances of water metabolism during disturbances of the functions of the nervous system. The close connection between the single links of the endocrine system and the action of the hypophysis through the trophic hormones on the various glands of internal secretion also play an important part in the regulation of water metabolism. W. R. Henn



FATEYEVA, M.N.

The participation of the insulin system of the pancreas, sex glands and parathyroid glands in the regulation of water metabolism. M. N. Fateeva. *Problemy Endokrinol.* (U. S. S. R.) 9, No. 1, 85-94(1940). Injection of insulin causes in rabbits a definite decrease of the colloidal-osmotic pressure of blood-plasma proteins to 7-17 cm. of water column. Insulin retards the flow of tissue lymph, increases the Ca and Cl contents, and decreases the sugar, albumin and blood K contents. Reserve alky does not change. Insulin also increases the permeability of cell membranes and regulates water metabolism, the distribution of Cl and the ability of tissues to bind water. The regulation of water metabolism is effected through a direct action on carbohydrate metabolism. Folliculin has no noticeable effect on diuresis in normal persons. In diabetes insipidus large doses of folliculin sometimes produce an antidiuretic effect. Testicular hormone decreases polyuria and glucosuria in diabetes mellitus. The opposite effect (increase of the sepn. of water) is observed in nondiabetics. Administration of folliculin increases hydration in all organs and tissues, except the liver and hypophysis, in which hydration remains unchanged and the horn of the uterus in which hydration decreases slightly. Changes in mineral metabolism during dysfunction of the parathyroid glands concern not only Ca and P, but also Na. The parathyroid glands are closely connected with water and electrolyte metabolism.

W. R. Heun

FOTEYEVA M. N. FA 21/49T91

USSR/Medicine - Goiter Apr 48
Medicine - Statistics, Medical

"Outline of the Work of the Expedition of the Study of Endemic Goiter in the Ukraine Near the Carpathians," M. N. Foteyeva, 4 3/4 pp

"Vest. Ak. Med. Nauk SSSR" No 4

Reviews circumstances which led to organization of expedition. Gives results for Chernovits and Stanislav Oblasts. Expedition of 1947 should be first of several

21/49T91

1. FOTEYEVA, M.N.

2. USSR (600)

4. Diagnosis, Radioscopic

7. Kymography in the study of cardiovascular disorders, Vop.pat.serd.sos.sist. 2 no. 2; 1953.

9. Monthly List of Russian Accessions, Library of Congress, APRIL 1953, Uncl.

FOTEYEVA, M.N.; SUL'YE, Ye.V.; TOLOKNOVA, Ye.A.; NESTEROVA, A.P.; MAYSNIKOV, A.L., professor, deystvitel'nyy chlen Akademii meditsinskikh nauk SSSR, direktor.

Rate of blood flow in hypertension determined with radioactive sodium. Terap.arkh. 25 no.3:7-14 My-Je '53. (MLRA 6:9)

1. Institut terapii Akademii meditsinskikh nauk SSSR.
(Hypertension) (Radioactive tracers)

FATEYEVA, M.N.; MASLOVA, K.K.

Pulmonary circulation rate in hypertension (determination with radioactive sodium) Terap. arkh. 26 no.5:3-6 S-O '54. (MLRA 8:2)

1. Is Instituta terapii (dir. deystvitel'nyy chlen AMN SSSR prof. A.L.Myasnikov) AMN SSSR.

(SODIUM, radioactive,
pulm. circ. rate determ. in hypertension)
(HYPERTENSION, physiology,
pulm. circ. rate, determ. with radiosodium)
(BLOOD CIRCULATION,
rate of pulm. blood flow, in hypertension, determ. with radiosodium)
(LUNGS, blood supply,
circ. rate in hypertension, determ. with radiosodium)

FATEYEVA, M. N.

"Experience in Clinical and Diagnostic Application of Some Radioactive Isotopes in the USSR," a paper presented at the Atoms for Peace Conference, Geneva, Switzerland, 1955

FOTEYEVA, M N.

2

2608. Influence of sleep caused by drugs on the rate of passage of sodium from the muscle tissue into the blood. M. N. Foteeva and A. C. Konikowa *Vop. med. Khim.*, 1955, 1, 403—410; *Referat. Zh. Biol.*, 1956, Abstr. No. 78076.—The rate of transport of the radioactive Na through the capillaries of muscles was studied. Rabbits were anaesthetised with a soln. containing 10% urethane and 0·75% veronal introduced subcut. (15–20 ml.) Rabbits slept 24–72 hr. NaCl soln. (1%) containing 10–20 μc of ^{24}Na was injected 1 cm. deep into one of the muscles of the femur. Anaesthesia reduced the rate of the passage of ^{24}Na by about 50%. (Russian)

G. Frolen

FATEYEVA, M.N.; KLIMOV, V.S.; GORBARENKO, N.I.; DENISOVA, Ye.A.; ERINA, Ye.V.; OSTAPKOVICH, V.Ye.

Early diagnosis of chronic radiation sickness. Vest.rent. i rad. no.2:16-23 Mr-Ap '55. (MLRA 8:5)

1. Iz Instituta terapii AMN SSSR (dir. deystvitel'nyy chlen Akademii meditsinskikh nauk SSSR prof. A.L.Myasnikov)
(RADIATION SICKNESS, diagnosis)

FATEYEVA, M.N.; MASLOVA, K.K.

Circulation rate in rheumatism. Terap.arkh.27 no.3:40-43 '55.
(MLRA 8:9)

1. Iz Instituta terapii (dir.-deystvitel'nyy chlen AMN SSSR prof. A.L.Myasnikov) Akademii meditsinskokh nauk SSSR)

(RHEUMATIC HEART DISEASE, physiology,
circ.rate)
(BLOOD CIRCULATION,
rate in rheum. heart dis.)

FATEYEVA, M.N., doktor meditsinskikh nauk

Trip to England. Med.rad. 1 no.1:91-95 Ja-F '56. (MLRA 9:9)
(GREAT BRITAIN--RADIOLOGY, MEDICAL)

FATEYEVA, M.N.; MASLOVA, K.K.

Blood flow rate in the lesser circulation in rheumatism. Med.rad. 1 no.4:76-81 Jl-Ag '56. (MLRA 9:12)

1. Iz Instituta terapii (dir. - deystv. chlen AMN SSSR prof. A.L. Myasnikov) AMN SSSR.

(CARDIOVASCULAR DISEASES, blood in
slow flow rate in lesser circulation)
(BLOOD CIRCULATION, in various dis.
slow flow rate in cardiovasc. dis.)

FATEYEVA, M.N.; MASLOVA, K.K.

Tissue blood supply in atherosclerosis. Med. rad. 1 no.6:69-73 N-D '56. (MLRA 10:2)

1. Is Instituta terapii AMN SSSR.
(ARTERIOSCLEROSIS, pathol.
tissue blood supply)
(BLOOD CIRCULATION, in various dis.
tissue supply in arteriosclerosis)

PATEYEVA, M.N.

"Problems of Medical Radiology in the Clinic," by M. N. Pateyeva, Doctor of Medical Sciences (Moscow), Vestnik Akademii Meditsinskikh Nauk SSSR, No 3, 1956, pp 71-76

The author reviews the scientific reports of the clinical section of the All-Union Conference on Medical Radiology held in January and February 1956. The work of this section was devoted to problems of the peaceful use of atomic energy, the use of radioactive isotopes in the diagnosis and treatment of diseases, characteristics of the action of ionizing radiation on the animal organism, and problems of the prophylaxis and treatment of radiation sickness.

A number of reports was devoted to the clinical aspects of chronic radiation sickness in man.

Biochemical investigations in chronic radiation sickness showed a reduction in the oxygen capacity of hemoglobin of whole blood, a sharp reduction in the content of easily separated iron, changes in the blood sugar curve, a change in the activity of hyaluronidase, and a decrease in the content of histamine and protein fractions. Prof A. A. Bagdasarov and A. S. Rogacheva proposed a method for the treatment of the acute and chronic types of radiation by transfusing leucocytic mass. The use of this method in combination with others provided a good therapeutic effect -- the restoration of disturbed hemopoiesis.

Sum.1345

FATEYEVA, M. N.

A group of reports was devoted to a study of radiation sickness resulting from radiation therapy of malignant tumors.

A series of works at the conference was devoted to experimental research and the study of the effect of ionizing radiation on the animal organism.

The characteristics of the clinical course of radiation sickness were discussed in a series of reports. These reports included data on the clinical picture resulting from external gamma and beta and internal irradiation.

I. N. Usacheva reported on the sequellae of acute radiation sickness in dogs. Observations on a group of animals which had acquired radiation sickness after the administration of lethal doses of X rays show that even at the end of 2 years after irradiation complete clinical recovery of the animals does not take place. The descendants of the dogs were well.

SyM. 1345

FATEYEVA M.N.

The report of V. A. Samtsova and others on the effect of ionizing radiation on the reactivity of the animal organism aroused much interest. In the irradiated animal the reaction to adrenalin is much stronger from the standpoint both of arterial pressure and of the heart. Animals react much more strongly to the administration of carbocholine. Increased sensitivity to various pharmaceuticals was observed.

G. M. Gorban' and P. P. Saksonova presented a report on the reaction of irradiated animals to various narcotics such as hexanal, urethan, diethyl ether, chloroform, and nitrous oxide. When the radiation sickness was at its height the sensitivity of the animals to various types of narcotics such as hexanal and diethyl ether sharply increased. The usual narcotic dose resulted in a serious condition, sometimes in death. The animals responded best to nitrous oxide, and there was no essential difference in the reaction of the irradiated and nonirradiated animals. Combined narcosis using nitrous oxide and hexanal also usually gave good results, in both the control animals and the irradiated group of animals.

Some interesting data were presented by L. F. Semenov and Ye. A. Prokudina on the use of certain neurotropic compounds in the prophylaxis of radiation sickness. The prophylactic administration of large doses of adrenalin in combination with acetylcholine before irradiation significantly decreased the seriousness of the clinical picture. As a result 31% of the animals survived, whereas all of the control group died.

SUM. 1345

FATEYEVA, M.N.

Use of the abor- agents in a smaller dose which did not disturb the vital processes of the animals provided a lesser protective affect. It is interesting to note that synthetic preparations of adrenalin and acetylcholine provided no protection. According to the authors the protective affect of cystineamine can be attributed to its structural similarity with adrenalin and acetylcholine.

M. A. Tumanyan reported on an experimental investigation of chemotherapy in radiation sickness. Use of the usual antibiotics in combating autoinfection in monkeys with radiation sickness led, in a group of cases, to clinical recovery of the animals. One of the meetings of the section was devoted entirely to a study of combination injuries -- radiation and traumatic. These included wounds of soft tissues, hemorrhage, and fractures. Open and closed fractures in animals, obviously exacerbating the course of radiation sickness, resulted in a death rate of the irradiated animals two or three times greater. (N. I. Blinov). A detailed study of this question showed that general irradiation of rabbits with a dose of 1,000 roentgen greatly delays formation of bony calluses and healing of the fragments.

As was shown by the investigations of N. I. Blinov, wounds of soft tissues and subsequent surgical treatment of the wounds in irradiated animals in the initial stages of irradiation sickness do not affect the rate of survival.

SUM-1345

FATEYEVA, M. N.

The effect of hemorrhage on the course of radiation sickness was clarified in the reports of V. P. Pravetskiy, M. Ya. Chaykovsky, and others. The investigation showed that the course of radiation sickness is directly related to the period when hemorrhage occurs and to the amount of blood loss. If the hemorrhage occurs before irradiation or immediately after irradiation in an amount equal to 10 or 20 percent of the volume of circulating blood, the course of radiation sickness is less serious and the survival rate of the animals is higher than in the controlled group. "The most serious clinical state of radiation sickness was observed at the end of 15-30 minutes or at the end of 12 hours after irradiation when a comparatively large amount of blood was lost." The administration of blood substitutes showed a beneficial effect on the course of radiation sickness. (U)

SuM. 1345

FATEYEVA, M.N., doktor meditsinskikh nauk, professor.

For wider contacts with scientists. Nauka i zhizn' 23 no.5:5 '56.
(MLRA 9:8)

(RADIOTHERAPY)

PATEYKINA, M.N., doktor meditsinskikh nauk; MASLOVA, K.K., kandidat meditsinskikh nauk

Functioning of the thyroid gland in rheumatic heart disease. Terap. arkh. 28 no.7:32-37 '56. (MLRA 10:1)

1.Iz Instituta terapii AMN SSSR (dir. - deystvitel'nyy chlen AMN SSSR prof. A.L.Myasnikov)

(RHEUMATIC HEART DISEASE, compl.
hyperthyroidism, radioiodine uptake determ.)
(HYPERTHYROIDISM, etiol. and pathogen.
rheum. heart dis., radioiodine uptake determ.)
(IODINE, radioactive
diag. of hyperthyroidism in rheum.heart dis.)

FATEYEVA, M.N.

Recent progress in radiodiagnosis. Med.rad. 4 no.1:77-81 Ja '59. (MIRA 12:2)
(ISOTOPES,
diag. use, review (Rus))

FATEYEVA, M.N.

Review of E. Quimby, S. Feitelberg and S. Silver's "Radioactive isotopes in clinical practice" [in English]. Med.rad. 4 no.11:86-87 N '59. (MIRA 13:2)
(RADIOLOGY, MEDICAL) (QUIMBY, E.) (FEITELBERG, S.) (SILVER, S.)

FATEYEVA, Margarita Nikolayevna; ZEDGENIDZE, G.A., prof., red.; BARANOVA, Ye.F., red.; LYUDKOVSKAYA, N.I., tekhn.red.

[Essays on radioisotopic diagnosis] Ocherki radioizotopnoi diagnostiki. Pod red. i s predisl. G.A.Zedgenidze. Moskva, Gos.izd-vo med.lit-ry, 1960. 267 p. (MIRA 14:4)

1. Deystvitel'nyy chlen AMN SSSR (for Zedgenidze).
(RADIOISOTOPES) (DIAGNOSIS, RADIOSCOPIC)

FATEYEVA, M.M.

Dispensery observation of laboratory personnel. Med. rad. 5 no.1:12-18 Ja '60. (MIRA 15:3)
(RADIATION--PHYSIOLOGICAL EFFECT)

FATEYEVA, M.N.

Present and future aspects of developments concerning the use of radioactive isotopes and radiations in the diagnosis of various diseases. Med.rad. 5 no.5:17-21 '60. (MIRA 13:12)
(RADIOISOTOPES) (RADIATION—MEASUREMENT)

FATEYEVA, M.N.; KLIMOV, V.S.; PONIZOVSKAYA, A.I.; GORBARENKO, N.I.; SOKOLOV, V.V.; SMIRNOVA, M.I.

Effect of Cs^{137} on the human organism. Med.rad. 5 no.7:14-19 '60. (MIRA 13:12)
(RADIATION—PHYSIOLOGICAL EFFECT) (CESIUM—ISOTOPES)

FATEYEVA, M.N.; PENIZOVSKAYA, A.I.; SOKOLOV, V.V.; GORBARENKO, N.I.; BENISOVA, Ye.A.; OSTAPKOVICH, V.Ye.

Initial reactions of the human organism to the action of ionizing radiations. Med. rad. 5 no.8:3-7 '60. (MIRA 13:12)
(RADIATION—PHYSIOLOGICAL EFFECT)

FATEYEVA, M.N.; IVANITSKAYA, L.A.; POLEKHOVA, T.M.; SMIRNOVA, M.I.

Study of the functional state of the thyroid gland with the aid of the DSU-60 apparatus. Med.rad. no.9:68-71 '61. (MIRA 15:1)

(RADIOLOGY, MEDICAL—EQUIPMENT AND SUPPLIES)
(THYROID GLAND) (IODINE—ISOTOPES)

FATEYEVA, Margarita Nikolayevna; LYASS, F.M., red.; BEL'CHIKOVA, Yu.S., tekhn. red.

[Radioactive isotopes in the diagnosis of cardiovascular diseases] Radioaktivnye izotopy v diagnostike serdechno-sosudistykh zabolevanii. Moskva, Medgiz, 1963. 90 p. (MIRA 17:1)

FATKYEVA, M.N.

Data on the use of new radioactive isotopes in clinical diagnostic investigations. Med. rad. 8 no.7:3-11 Jl '63. (MIRA 17:1)

1. Iz Instituta meditsinskoy radiologii AMN SSSR.

LOGINOV, A.S.; FATEYEVA, M.N.; REGINSKIY, A.N.

Experience in the combined use of radioisotope scanning and laparoscopy in the diagnosis of liver diseases. Med. rad. 9 no.3:37-47 Mr '64.
(MIRA 17:12)

1. Institut meditsinskoy radiologii AMN SSSR i Institut terapii AMN SSSR, Moskva.

FATEYEVA, M.N.; PROSTYAKOV, K.M.; TUZHILIN, S.A.; KONDRAT'YEVA, A.P.; POLEKHOVA, T.M.

Determination fat assimilation in gastrointestinal diseases by means of I^{131} trioleate glycerin. Med.rad. 10 no.3:11-16 Mr '65. (MIRA 18:6)

1. Institut meditsinskoy radiologii (dir. - deystvitel'nyy chlen AMN SSSR prof. G.A.Zedgenidze) AMN SSSR i klinika lechebnogo pitaniya (dir. - prof. I.S.Savoshchenko) Instituta pitaniya AMN SSSR, Moskva.

FATTYKHA, M. S.

Organizing experimental work for students of grade 5. Biol. v shkole no.5:52-55 S-O '60. (MIRA 13:11)

1. Penzenskiy pedagogicheskiy institut.
(Agriculture—Study and teaching)

KONOVA, I.V.; FATEYEVA, M.V.; IYERUSALIMSKIY, N.D.

First International Symposium in Italy. Mikrobiologiia 30 no.2: 371-374 Mr-Ap '61. (MIRA 14:6)
(FERMENTATION—CONGRESSES)

FATEYEVA, M.V.

Use of ion exchange resins for the purification of nonvolatile aliphatic acids in paper chromatography. Biokhimiia 27 no.1:32-37 Ja-F '62. (MIRA 15:5)

1. Department of Type Cultures, Institute of Microbiology, Academy of Sciences of the U.S.S.R., Moscow.
(PAPER CHROMATOGRAPHY) (ION EXCHANGE RESINS)
(ACIDS, FATTY)

[illegible] YAVTSEV, V.I.; PATEYUVA, M.V.; [illegible]

Variations in the composition of nonvolatile aliphatic a[illegible] produced by yeasts (Candida robusta, Candida pulcherrima, and Candida albicans) with different forms of resting cells. Mikrobiologiia 31 no.4:582-585 Jl-Ag '62.

(MIRA 18:3)

1. Institut mikrobiologii AN SSSR.

FATEYEVA, M.V.; GERASIMOVA, N.M.

Conference on the microbiology of fermentative processes. Izv. AN SSSR. Ser.biol. no.5:644-646 S-O '57. (MIRA 10:10)
(FERMENTATION)

FATEYEVA, M.V.

Effect of aeration on the development of acetone-ethyl bacteria and the nature of fermentation induced by them [with summary in English]. Mikrobiologiia 27 no.3:302-307 My-Je '58 (MIRA 11:9)

1. Biologo-pochvennyy fakul'tet Moskovskogo gosudarstvennogo universiteta im. M.V. Lomonosova.
(BACILLUS,
acetylethylicus, eff. of aeration on fermentation (Rus))

FATEYEVA, M.V. (Moskva)

Paper chromatography of organic acids. Usp. sovr. biol. no.2:152-166 S-O '60. (MIRA 13:11)
(PAPER CHROMATOGRAPHY) (ACIDS, ORGANIC)

KUDRYAVTSEV, V.I.; FATEYEVA, M.V.

Differences in the use of glucose by nonsporeforming yeasts (Candida robusta, C. pulcherrima, and C. albicans) with dissimilar morphology of resting cells. Mikrobiologiia 31 no.3:459-467 My-Je '62. (MIRA 15:12)

1. Institut mikrobiologii AN SSSR.
(YEAST) (GLUCOSE)

FATEYEVA, M.V.

Paper chromatography. Usp. mikrobiol. 1:149-166 '64. (MIRA 18:9)

FATEYEVA, M.V.

Preparation of material for the assay by paper chromatography of volatile fatty acids produced by yeast. Mikrobiologiia 33 no.3:533-536 My-Je '64. (MIRA 18:12)

1. Institut mikrobiologii AN SSSR. Submitted April 21, 1963.

FATEYEVA, M.V.

Purification of solutions of organic acids and sugars preceding paper chromatography with the aid of Soviet ion-exchange resins. Zhur.prikl.khim. 38 no.11:2576-2581 N '65. (MIRA 18:12)

1. Submitted October 4, 1963.

FATEYEVA, M.V.

Use of Soviet ion-exchange resins in the treatment of solutions containing sugar. Prikl. biokhim. i mikrobiol. 1 no. 6:723-726 N-D '65. (MIRA 18:12)

1. Institut mikrobiologii AN SSSR. Submitted June 25, 1965.

KAMCHATNOV, V.P., dotsent; GOLUBOVSKIY, I.Ye., dotsent; FATEYEVA, N.I., vrach-profpatolog

Industrial hygiene in the production of rubble pitch films. Gig.i san 26 no.12:25-30 D '61. (MIRA 15:9)

1. Iz kafedry fakul'tetskoy terapii Kazanskogo gosudarstvennogo meditsinskogo instituta, kafedry gigiyeny truda.
(BENZENE--TOXICOLOGY) (RESINS, SYNTHETIC)

U S S R

Investigation of furnaces for the production of frothed glass. D. H. Ginzburg and N. I. Patreva. *Steklo i Keram.* 8, No. 9, 11-13(1951); *Ceram. Abstr.* 1953, 68 0(in *J. Am. Ceram. Soc.* 36, No. 6).—An efficiency survey was made of a continuous installation consisting of a sintering furnace and an annealing furnace 1.5 m. apart. Loss of heat with outgoing gases was 48.96%. Heat consumption was 310,000 kcal./cu. m. of frothed glass blocks, with gas of CO_2 5.0, O 0.2, CO 23.1, H 0.2, CH_4 1.6, and N 55.0%. The coeff. of excess air was 4.27 in the sintering furnace and 6.13 in the annealing furnace. A proposed measure to increase capacity is redesign of the sintering furnace to raise the temp. in the preheating zone and of the annealing furnace to permit movement of the blocks on their sides. R. D. H.

FATEYEVA, N. I.

Dissertation: "Relation of the Formation Rate and the Properties of Cinders to Firing Conditions." Cand Tech Sci, Moscow Chemico-technological Inst, Moscow, 1953. Referativnyy Zhurnal--Khimiya, Moscow, No 14, Jul 54.

SO: SUM No. 356, 25 Jan 1955

FATEYEVA, I V T.

P01

Conditions of burning versus the rate of clinker formation and versus clinker quality. W. N. Jung and N. J. Fateeva. *Cement-Wapno-Gips* 10(19), 209-72(1954).—Cement raw materials with some addn. of ash (from burning powd. coal) were introduced in the form of blocks into a lab. furnace heated to 1400–1500° and kept there for 1–25 min. It was found that by such rapid heating the speed of reactions of the belite period can be increased 60–80 times (as compared to the rotary-kiln burning); the speed of reactions of the alite period is, however, the same, i.e. requires a long time. It is, hence, impossible to try to obtain a ready clinker by suspension of raw materials in hot gases, e.g. when the particles are falling down countercurrently to ascending gases. It was found that at 1400–1500° within 1 min. the formation of C_4AF and C_2S is complete and then the following reactions begin: $C_2S + C = C_3S$ and $CA + 2C = C_3A$, where C = CaO, S = SiO_2, A = Al_2O_3, and F = Fe_2O_3. Within approx. 5 min. formation of C_3A is completed. However, at the end of clinker burning, continued formation of C_3S from C_2S results in some decompn. of C_3A; this is because at 1450° C_2S is a more stable compn. than C_3A. Hence at the final stage of burning, chem. reactions of free lime are slowed down. The above compns. were calcd. from formulas by W. A. Kind (after detg. free CaO and the calcining loss in the samples). It was found that too long or too short burning of clinker reduces the strength of cement. Better comminution and addn. of CaF_2 do not decrease the burning time appreciably. Frank J. Hendel

FATEYEVA, N.I.

M

Effect of conditions of calcining on rate of formation and characteristics of clinker. V. N. Yung and N. I. Fateeva. *Tsement* 20, No. 3, 11-15(1954).—Lab. samples of feed having satn. coeffs. of 1.01, 0.93, 0.84, and 0.80 were held in a Kryptol furnace for 1-25 min. at 1350-1500° and then analyzed for free CaO and ignition loss. By rapid heating of the feed to 1400-1500°, the rate of reactions during the belite period of burning can be increased 60-80 times compared with rate of burning in a rotary kiln; the rate during the alite period is about the same as in the burning zone of a rotary kiln. It is impossible to obtain finished clinker by rapid heating of suspended feed at 1400-1500°; burning of suspended feed is expedient mostly for the belite period. At 1400-1500°, 1 min. is sufficient for formation of CA, C_4AF, and C_2S, after which, there follows satn. of C_2S to C_3S and of CA to C_4A due to free CaO. Formation of C_4A is completed in about 5 min. Toward the end of burning, C_3S also forms as a result of sepn. of CaO from C_4A, along with assimilation of residues of free CaO. This accounts for the slowing down of assimilation during the last period of burning. At 1450°, C_3S was more stable than C_4A.

B. Z. Kamich

Hungary/Chemical Technology. Chemical Products and Their Application -- Silicates. Glass. Ceramics. Binders, I-9

Abst Journal: Referat Zhur - Khimiya, No 2, 1957, 5293

Author: Jung, V. H., Fatejeva, N. J.

Institution: None

Title: Dependence of Rate of Clinker Formation and Properaties of the Clinker on Firing Conditions

Original Publication: Epitoanyag, 1955, 7, No 3, 115-118

Abstract: A translation. See Referat Zhur - Khimiya, 1955, 6070

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E192/E382

AUTHORS: Vereshchagin, L.F. and Fateyeva, N.S.

TITLE: A Method of Producing an Electric Arc at High Pressure

PERIODICAL: Pribory i tekhnika eksperimenta, 1960, Nr 1, pp 133 - 134 (USSR)

ABSTRACT: The equipment used in the investigation of arc discharges at high pressure in nitrogen or argon is shown in the diagram of Figure 1. The device is in the form of a thick-walled cylinder having an external diameter of 90 mm and internal diameter of 22 mm, its overall length being 235 mm. The cylinder is made of steel, type 40Kh, which was annealed to the Rockwell hardness of 40. The device could thus withstand the pressure of 5 000 atm. The middle portion of the cylinder having a length of 74 mm has thicker walls (since it contains an aperture for producing the pressure) and two electrical terminals. One of the electrodes, 24 , is fixed and is insulated from the main body. This is done by inserting a special cone 37 . The conical hole in this cone contains a steel cone 36 which carries a support for the electrode 25 . The tip of the cone 36 contains a steel rod 41 having a

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A Method of Producing an Electric Arc at High Pressure

diameter of 1.7 mm which is insulated from the shutter 38 by the cylinder 42 . At the end of the shutter the cylinder is terminated by the washer 43 . The second electrode 16 is moveable and is not insulated from the body but is grounded through it. The electrode can be displaced axially by 10 mm. The displacement of the electrode is achieved by imparting a movement to the rod 9 . The fixing for the electrode 16 is provided at the "high pressure" end of the rod. The screw 6 serves to move the rod. During the experiment the equipment is water-cooled. The water is circulated in the cooling sleeves 33 . During the investigation of arcs in nitrogen and argon the electrodes were made of carbon in order to obtain stable arcs. The arcs could be obtained with voltages of 80-90 V with currents not higher than 8 A. It was found that at pressures up to 300 atm the arc was generally stable. However, at increased pressures the resistance of the inter-electrode gap was greatly increased and the distance between the electrodes had to be reduced

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and the voltage between them increased in order to maintain the normal glow. The arc in argon is generally more stable than in nitrogen. The authors express their gratitude to G.V. Shcheglakov for his help in producing the equipment and in carrying out the experiments. There is 1 figure.

ASSOCIATION: Laboratoriya fiziki sverkhvysokikh davleniy AN SSSR (Laboratory of Ultrahigh Pressure Physics of the Ac.Sc., USSR)

SUBMITTED: September 29, 1958

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FATEYEVA, N.S.; GRISHKO, A.N. (Moscow)

Oxidation of nitrogen in an arc discharge under pressure. Zhur. fiz.khim. 35 no.11:2553-2556 N '61. (MIRA 14:12)

1. Akademiya nauk SSSR, Institut fiziki vysokikh davleniya.
(Nitrogen oxide)
(Electric discharges through gases)

L 16793-63 EPR/EPF(c)/EWP(q)/EWT(m)/BDS AFFTC/ASD Ps-4/Pr-4 JD/WH/K 12 67

ACCESSION NR: AP3007234 S/0020/63/152/001/0088/0091

AUTHOR: Fateyeva, N. S.; Vereshchagin, L. F., Corresponding member, AN SSSR; Koloty*gin, V. S.

TITLE: Optical method of determining the melting point of graphite as a function of pressure up to 3000 atm

SOURCE: AN SSSR. Doklady*, v. 152, no. 1, 1963, 88-91

TOPIC TAGS: graphite melting point, graphite melting pressure dependence, graphite melting pressure, graphite

ABSTRACT: Pressure dependence of the melting point of graphite was determined at pressures up to 3000 atm. The experiment was carried out to obtain quantitative data by an exact method of automatic photoelectric recording. A graphite specimen in the form of a 10-mm rod, 1.5 mm in diameter, with a 0.8-mm neck in the middle, was heated up to melting point by increasing electric current to over 40 amp within a couple of seconds. The specimen was fixed across the longitudinal axis of a cylindrical pressure

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chamber. One end of the chamber was arranged for visual observation; the other end contained an optical focussing system. After emerging from the focussing system of the chamber, the light beam from the heated specimen was made to pass alternately through two interference filters which separated bands of the order of 2 mu from the continuous emission spectrum to be projected upon the slit of the FEU-22 photomultiplier. Gray filters in the same path were required to compensate for increased luminosity of the specimen when heated at rising pressures. A 29-mm cylindrical quartz rod, 7 mm in diameter, was inserted between the specimen and the focussing lens to eliminate the effects of dispersion and the fluctuations due to convection flows. The distance between the specimen and the face of the quartz rod was 2 mm and the focal length of the lens was 33 mm. The image at the slit of the photomultiplier was enlarged 20 times. The output of the multiplier after amplification was recorded on a MPO-2 tape oscillograph. Measurements showed that the melting temperature of graphite increases slowly with increasing pressure from 4650K at atmospheric pressure to 4750K at 3000 atm. "The authors express their deep appreciation to Academician I. V. Obreimov and Professor D. Ya.

L 16793-63

ACCESSION NR: AP3007234

Svet for their valuable assistance in the investigations. G. V. Shcheglakov took part in the work." Orig. art. has: 3 figures.

ASSOCIATION: Institut fiziki vy*sokikh davleniy, Akademii nauk SSSR (Institute of Physics of High Pressures, Academy of Sciences SSSR); Moskovskiy gosudarstvenny*y universitet im. M. V. Lomonosova (Moscow State University)

SUBMITTED: 09Apr63 DATE ACQ: 30Sep63 ENCL: 00

SUB CODE: PH NO REF SOV: 003 OTHER: 002

APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R000412510007-1"

FATEYEVA, N.S.; VERESHCHAGIN, L.F.; KOLOTYGIN, V.S.

Optical method for determining the melting point of graphite as dependent on pressure up to 40,000 atm. Dokl. AN SSSR 152 no.2:317-319 S '63. (MIRA 16:11)

1. Institut fiziki vysokikh davleniy AN SSSR i Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova. 2. Chlen-korrespondent AN SSSR (for Vereshchagin).

L 60361-65 EWA(h)/EWP(k)/EWT(d)/EWT(l)/EWP(h)/ETC(m)/EEC(m)/EWA(d)/EWP(l)/EWP(v)
Pf-4/Pl-4/Po-4/Pq-4/Ps-4/Peb WW
ACCESSION NR: AP5019057 UR/0286/65/000/012/0085/0085
681.121

AUTHORS: Podgoyetskiy, M. L.; Shvartser, V. I.; Sheynkerman, E. Z.; Shvartser, L. I.; Turina, M. A.; Fatoyeva, N. V.

TITLE: Pneumatic flow meter. Class 42, No. 172074

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 12, 1965, 85

TOPIC TAGS: flow meter, pneumatic device

ABSTRACT: This Author Certificate presents a pneumatic flow meter containing a measuring unit and a pneumatic transducer. To increase the accuracy of measurement, the sensitive unit of the measuring unit is in the form of a membrane. The membrane is provided with a constricting device, e.g., a throttle, which is kinematically coupled by a system of levers to a compensation unit (see Fig. 1 on the Enclosure). To eliminate natural vibrations and to obtain zero compensation, an integrating regulator is included in the feedback channel. Orig. art. has: 1 diagram.

ASSOCIATION: Konstruktorskoye byuro "Tsvetmetavtomatika" pri gosudarstvennom komitete tyazhelogo energeticheskogo transportnogo mashinostroyeniya pri gosplane, SSSR (Construction Bureau "Automatic Equipment for Nonferrous Metals" for the State Committee of Heavy Power Transport Machine Construction for Gosplan, SSSR)

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L 60361-65

ACCESSION NR: AP5019057

SUBMITTED: 20May63 ENCL: 01 SUB CODE: IE

NO REF SOV: 000 OTHER: 000

Card 2/3

L 60361-65

ACCESSION NR: AP5019057 ENCLOSURE: 01

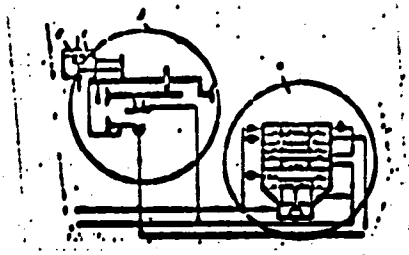

Fig. 1.
1- membrane; 2- constricting device; 3- compensation unit; 4- integrating regulator

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FATEYEVA, O. F.

"The Problem of Increasing the Productivity of Strawberries in the Irrigated Zone of the Alma-Atinskaya Oblast." Cand Agr Sci, Inst of Soil Sciences, Kasakh Affiliate of VASKhNIL, Alma-Ata, 1953. (RZhBiol, No 8, Dec 54)

Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (12)
SO: Sum. No. 556, 24 Jun 55

FATEYEVA, O.F

COUNTRY : USSR
CATEGORI : Cultivated Plants. Fruit. Berry. Nuciferous. M
Tea.
ABS. JOUR. : RZhBiol., No. 3, 1959, No. 11126

AUTHOR : Fateyeva, O. F.
INST. : Institute of Agriculture, Kazakh Affiliate, All-Union*)
TITLE : Biology and the Principal Problems of Agricultural Technique for Wild Strawberry (Fragaria vesca).

ORIG. PUB. : Tr. In-ta zemledeliya. Kazakhsk. fil. VASKhNIL., 1956, 5, 133-158

ABSTRACT : The work was conducted at the elevations of 950 and 1200-1500 meters above sea level with the varieties Urozhaynyy, Adam Cox, Luis Gautier and Louise. With different periods of leaf formation, the strawberries (Fragaria vesca) have longevity of from 80 to 250 days. The roots of the wild strawberries (Fragaria vesca) are of different ages reaching 9 years. The largest percentage of the living growing roots is assigned to the first year (100%). At the age of 4 years, the percentage of living growing

CARD: 1/4 *) Academy of Agricultural Sciences imeni Lenin